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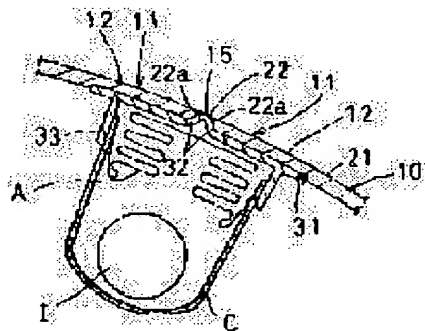
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(54) STRUCTURE FOR CAR INTERIOR SIDE MEMBER INTEGRALLY HAVING AIR BAG DOOR

(57)Abstract:

PROBLEM TO BE SOLVED: To quickly burst a burst expected part at operating time and prevent easily cracking at normal time, by providing a reinforcing resin member in a reverse surface of a car interior side member main unit in an air bag door reverse side, and thinly forming a bending part to a surface side of the car interior side member main unit so that the reinforcing resin member divides the burst expected part of the car interior side member main unit.

SOLUTION: A car interior side member main unit 21 is constituted by a hard resin, in a reverse side thereof, a reinforcing resin member 31 is provided, a burst expected part 15 opening an air bag door 11, when an air bag A is inflated, is provided. A divided part 22 formed along the burst expected part 15 is bitten by the reinforcing resin member 31, to be exposed by a surface of the car room side member main unit 21. The reinforcing resin member 31 is made as a resin softer than a hard resin of the car room side member main unit 21, to be provide in a reverse surface side of the air bag door 11 by smoothing bursting at operating time, an almost reverse V-shaped bending part 32 is formed so as to protrude to a side of the car interior side member main unit 21. The bending part 32, in the case of pressing in the vicinity of the burst expected part 15 from a surface of a car interior side member 10 at normal time, has large rigidity, so as to prevent cracking of the burst expected part 15.



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CLAIMS

[Claim(s)]

[Claim 1] Vehicle room flank material which has in one the air back door which is characterized by providing the following, and which the fracture schedule section is formed in the vehicle room flank material made of a resin the letter of the abbreviation for H characters, in the shape of abbreviation for U characters, etc., and is fractured and opened from the aforementioned fracture schedule section at the time of air bag expansion. The vehicle room flank material main part which consists of rigid resin, the reinforcement resin which it was prepared in the rear face of the vehicle room flank material main part which consists of a resin more flexible than the rigid resin of this vehicle room flank material main part, and carries out an abbreviation equivalent to the background of the aforementioned air bag door at one, it was crooked to the vehicle room flank material book body-surface side so that a vehicle room flank material main part might be divided in the aforementioned fracture schedule section, and this flection was used as thin meat, and has been exposed to a vehicle room flank material book body surface

[Claim 2] Structure of the vehicle room flank material which has in one the air bag door characterized by crooking a reinforcement resin member to the front-face side of a vehicle room flank material main part during the ends end of the fracture schedule section, forming the flection for hinges in a claim 1, and the thickness of a vehicle room flank material main part being thin in this section.

[Claim 3] Vehicle room flank material which has in one the air back door which is characterized by providing the following, and which the fracture schedule section is formed in the vehicle room flank material made of a resin the letter of the abbreviation for H characters, in the shape of U character, etc., and is fractured and opened from the aforementioned fracture schedule section at the time of air bag expansion. The vehicle room flank material main part with which the laminating of a foam and the epidermis was carried out to the base material which consists of rigid resin, the reinforcement resin which it was prepared in the rear face of the base material which consists of a resin more flexible than the rigid resin of the aforementioned base material, and carries out an abbreviation equivalent to the background of the aforementioned air bag door at one, it was crooked to the base-material front-face side so that a base material might be divided in the aforementioned fracture schedule section, and this flection became thin meat, and has been exposed to a base-material front face -- a member

[Claim 4] Structure of the vehicle room flank material which has in one the air bag door characterized by the reinforcement resin member touching the rear face of epidermis in the fracture schedule section in a claim 3.

[Claim 5] Structure of the vehicle room flank material which has in one the air bag door characterized by crooking a reinforcement resin member to a base-material front-face side during the ends end of the fracture schedule section, forming the flection for hinges in claims 3 or 4, and the thickness of a base material being thin in this section.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the structure of the vehicle room flank material which has an air bag door in one.

[0002]

[Description of the Prior Art] In recent years, in the automobile, air bag equipment came to be formed also in a passenger seat. This air bag equipment is attached in the background of the vehicle room flank material which consists of an air bag, a hold case called canister with which the air bag is contained, and a starting device (inflator), and consists of an instrument panel of the front face of a passenger seat etc. The air bag section of the instrument panel in which air bag equipment was formed has expansion opening for an air bag, and this opening is covered by the air bag door with the aforementioned instrument panel and appearance of the same kind at time of peace. And when an automobile once gets a big shock by collision etc., the air bag contained in the aforementioned air bag case operates and expands, and opening of the air bag door is pushed and carried out from the inside.

[0003] However, if it is in the thing of the structure where expansion opening for air bags and an air bag door are constituted by another object, it is easy to produce a crevice to the circumference of an air bag door by few [a product size] product contraction accompanying [vary or] use etc., and there is a possibility that the appearance of an instrument panel may be spoiled. Moreover, attaching an air bag door in expansion opening for air bags of an instrument panel according to a back process makes a man day increase.

[0004] then, like the instrument panel 160 shown in drawing 20 which is drawing 19 and its f-f cross section by recently At the rigid resin 161 rear face which consists of polypropylene resin etc., the fracture schedule section 162 of notch-like thin meat While it forms so that a flat-surface configuration may turn into a letter of the letter of the abbreviation for U characters, or the abbreviation for H characters which is not illustrated like this example, and carrying out partition formation of the air bag door Da, what backed the back up plates 163, such as an aluminum board and a griddle, at this air bag door Da rear face is proposed. An air bag and C of the hinge region and A by which agreement 164 is constituted between the edges of the fracture schedule section 162 are air bag hold cases. As shown in drawing 21 , when an air bag A expands according to this structure, the fracture schedule section 162 of the aforementioned instrument panel 160 fractures, and the air bag door Da opens. 162a is [0005] which is the portion which the aforementioned fracture schedule section 162 fractured. Moreover, as shown in drawing 23 which expands drawing 22 and its part, laminating formation of the synthetic-resin foams 171, such as a polyurethane foam, is carried out at one, and the vehicle room flank material (instrument panel) P which comes to cover the front face with the synthetic-resin tabulation hide 172 further is known by the base material 174 in which it became from rigid resin, such as polypropylene resin, and the expansion opening O for air bags was formed. the light-gage fracture schedule section by which agreement 173 was formed in epidermis 172, and 175 — air — a bug — an air bag door and T of the core material for doors, the anchoring member to which 176 fixes the vehicle room flank material P and the air bag hold case C, and D are the fracture schedule sections of a foam

171 According to this structure, as shown in drawing 24, the air bag door D is pushed by the air bag A from a background at the time of air bag expansion, the core material 175 for air bag doors which consists of a metal plate etc. is pushed up, according to the press force, the fracture schedule section T of a foam and the light-gage fracture schedule section 173 of epidermis 172 fracture, and the air bag door D opens. The fracture section of the foam by which Agreements Ta and Tb were divided, and 177 are hinge regions.

[0006] however, if some which consist of rigid resin have the former type, i.e., vehicle room flank material, thickness of the fracture schedule section is made very thin so that it may fracture promptly by expansion of an air bag — kicking did not become impossible and the design was not easy on balance with a moldability And if thickness of the fracture schedule section is made very thin, when a fracture schedule section front face will be pressed by crew etc. at time of peace, a possibility of producing a crack etc. is in this fracture schedule section.

[0007] If some which consist of the base material, foam, and epidermis made of rigid resin had the latter type, i.e., vehicle room flank material, since core materials for air bag doors, such as a griddle, certainly had to be fixed to expansion opening for air bags formed in the base material on the other hand, a fabrication operation is complicated and there was a problem used as cost quantity.

[0008] Furthermore, also in which the aforementioned type, if an air bag carries out predetermined-time progress after it expands and extends an air bag door, it will fade. In that case, an air bag door becomes [being opened with as without closing completely, and], and will be in the state where fracture section 162a of the air bag doors Da and D and Ta turned to the upper part. Since the fracture surface of rigid resin or the end face of the core material 175 for air bag doors was exposed, the fracture section of this air bag door was hard, and it was not desirable.

[0009]

[Problem(s) to be Solved by the Invention] This invention was made in view of the aforementioned point, the fracture schedule section fractures it promptly by expansion of an air bag, and an air bag door opens it, and it cannot produce a crack easily in the fracture schedule section at time of peace, and offers the structure of the high vehicle room flank material of the safety concealed by the resin with the rigid resin end face still more flexible than it in the fracture section of an air bag door.

[0010]

[Means for Solving the Problem] In the vehicle room flank material which has in one the air back door which the fracture schedule section is formed in the vehicle room flank material made of a resin the letter of the abbreviation for H characters, in the shape of abbreviation for U characters, etc., fractures invention of a claim 1 from the aforementioned fracture schedule section at the time of air bag expansion, and is opened It is prepared in the rear face of the vehicle room flank material main part which consists of rigid resin, and the vehicle room flank material main part which consists of a resin more flexible than the rigid resin of this vehicle room flank material main part, and carries out an abbreviation equivalent to the background of the aforementioned air bag door at one. It is crooked to a vehicle room flank material book body surface side so that a vehicle room flank material main part may be divided in the aforementioned fracture schedule section, and this flection starts the structure of the vehicle room flank material which has in one the air bag door characterized by the bird clapper from the reinforcement resin member which considered as thin meat and has been exposed to a vehicle room flank material book body surface.

[0011] If it is in invention indicated by this claim 1, vehicle room flank material consists of a vehicle room flank material main part made of rigid resin which defines the appearance, and a reinforcement resin member prepared in the portion equivalent to the air bag door rear-face portion of the rear face of a vehicle room flank material main part, an air bag door portion is pushed by expansion of an air bag from the inside, and it fractures in the fracture schedule section.

[0012] In the aforementioned fracture schedule section, since it was crooked to the vehicle room flank material book body surface side and has exposed to a vehicle room flank material book

body surface so that a reinforcement resin member more flexible than the rigid resin of a vehicle room flank material main part may divide a vehicle room flank material main part, the reinforcement resin member which buries the fragmentation section of a vehicle room flank material main part fractures by expansion of an air bag. Therefore, in order that a reinforcement resin member more flexible than the rigid resin of a vehicle room flank material main part may fracture, the fracture will be made promptly. moreover, the reinforcement resin in the aforementioned fracture schedule section from the ease of carrying out of the fracture — a setup of the thickness of a member can be performed thickly, and the thickness range which can be set up becomes large and it becomes easy [fabrication] from the case of rigid resin

[0013] Furthermore, as mentioned above, in the fracture schedule section, the fragmentation section is formed in a vehicle room flank material main part of a reinforcement resin member, and the inner skin (minute cross section) of the fragmentation section is in the state where it was covered by the reinforcement resin member crooked to the front-face side of a vehicle room flank material main part. therefore, the aforementioned reinforcement resin — the fracture section end face of the air bag door opened by fracture of a member consists of wrap reinforcement resin members in the fragmentation circles peripheral surface of the aforementioned vehicle room flank material main part, and will be in the state where it was concealed by the resin (reinforcement resin member) more flexible than rigid resin

[0014] In a claim 1, a reinforcement resin member is crooked to the front-face side of a vehicle room flank material main part during the ends end of the fracture schedule section, and invention of a claim 2 forms the flection for hinges, and is characterized by the thickness of a vehicle room flank material main part being thin in this section.

[0015] If it is in invention of this claim 2, since a stiff vehicle room flank material main part is made thin by the hinge region and rigidity is low, at the time of air bag expansion, following fracture of the fracture schedule section, an air bag door is promptly crooked by the hinge region, opens to a vehicle interior-of-a-room side, and realizes smooth expansion of an air bag. Since a reinforcement resin member is especially prepared in the rear face of a vehicle room flank material main part in invention of a claim 1 at one, although there is a possibility that the thickness in a hinge region may increase and rigidity may increase, according to invention of this claim 2, the rigidity of a hinge region can be reduced and an air bag door can open it more promptly. Consequently, before an air bag door is still enough crooked in a vehicle interior-of-a-room side, it can prevent more certainly an air bag's overflowing the crevice between the fracture schedule sections (fracture schedule section after fracture) into the vehicle interior of a room, and barring expansion of a smooth air bag. Furthermore, since it is not necessary to prepare the crevice for lowering the rigidity of a hinge region to the front-face side of an air bag door, the appearance of vehicle room flank material becomes good.

[0016] In the vehicle room flank material which, on the other hand, has in one the air back door which the fracture schedule section is formed in the vehicle room flank material made of a resin the letter of the abbreviation for H characters, in the shape of U character, etc., fractures invention of a claim 3 from the aforementioned fracture schedule section at the time of air bag expansion, and is opened The vehicle room flank material main part with which the laminating of a foam and the epidermis was carried out to the base material which consists of rigid resin, It is prepared in the rear face of the base material which consists of a resin more flexible than the rigid resin of the aforementioned base material, and carries out an abbreviation equivalent to the background of the aforementioned air bag door at one. It is crooked to a base-material front-face side so that a base material may be divided in the aforementioned fracture schedule section, and this flection serves as thin meat and the structure of the vehicle room flank material which has in one the air bag door characterized by the bird clapper from the reinforcement resin member exposed to a base-material front face is started.

[0017] If it is in invention indicated by this claim 3, vehicle room flank material turns into a base material made of rigid resin from the reinforcement resin member in which a foam and epidermis were prepared into the portion equivalent to the vehicle room flank material main part by which the laminating was carried out, and the air bag door rear-face portion on the aforementioned rear face of a base material. A base material consists of the same composition as the vehicle

room flank material main part indicated by the claim 1 in invention of this claim 3. And by expansion of an air bag, while a reinforcement resin member fractures promptly in the fracture schedule section of a base material, the foam and epidermis of the fracture schedule section of this base material and a corresponding portion are also fractured, and an air bag door opens. The fracture section end face of an air bag door will be in the state where it was concealed by the reinforcement resin member more flexible than the rigid resin of a base material, for the same reason as the vehicle room flank material main part in a claim 1.

[0018] Invention of a claim 4 is characterized by the reinforcement resin member in a claim 3 touching the rear face of epidermis in the fracture schedule section. if it is in invention of this claim 4 — the epidermis of the fracture schedule section, and a reinforcement resin — a member — since a foam does not intervene in between, in case vehicle room flank material fractures in the fracture schedule section, it can prevent that a foam disperses

[0019] Moreover, the reinforcement resin member in claims 3 or 4 is crooked to a base-material front-face side during the ends end of the fracture schedule section, and invention of a claim 5 forms the flection for hinges, and is characterized by the thickness of a base material being thin in this section. If it is in invention of this claim 5, since a stiff base material is made thin by the hinge region and rigidity is low, at the time of air bag expansion, following fracture of the fracture schedule section, an air bag door is promptly crooked by the hinge region, opens to a vehicle interior-of-a-room side, and realizes smooth expansion of an air bag.

[0020]

[Embodiments of the Invention] According to an attached drawing, this invention is explained in detail below. The example of invention of a claim 1 is explained first. Drawing 5 of drawing 1 is a cross section in which the perspective diagram of the vehicle room flank material of the example and drawing 2 show the time of the a-a cross section of drawing 3 [the perspective diagram near / the / an air bag door and] of drawing 1 becoming, and the air bag of drawing 4 becoming small at the time of air bag expansion.

[0021] The vehicle room flank material 10 shown in drawing 1 or drawing 3 constitutes the instrument panel of an automobile, and has the air bag door 11 in a passenger side at one. the reinforcement resin with which this vehicle room flank material 10 was formed in the background of the vehicle room flank material main part 21 and the vehicle room flank material main part 21 at one — it consists of a member 31, and the fracture schedule section 15 for fracturing at the time of air bag A expansion, and making the aperture of the air bag door 11 possible is formed in plane view abbreviation zygal so that the air bag door 11 may be divided In addition, let the flat-surface configuration of the fracture schedule section 15 be an abbreviation U typeface like the fracture schedule section 162 shown in drawing 19 of the term of the conventional technology. A sign 12 is a portion used as a hinge region, in case an air bag door opens, and it is located between 16 and 16 and between 17 and 17 in the ends end of the fracture schedule section 15.

[0022] The aforementioned vehicle room flank material main part 21 constitutes the front face while defining the appearance of the vehicle room flank material 10, and it consists of rigid resin mold goods formed in the necessary configuration by injection molding etc. The rigid resin which constitutes the vehicle room flank material main part 21 has the rigidity and intensity for which vehicle room flank material is asked, and general-purpose rigid resin, such as polypropylene resin (PP), is used. Especially, it is points, such as rigidity and configuration retentivity, to bending elastic-modulus (JIS-K7203 conformity) 20000 kgf/cm². The thing of 120 degrees C or more (4.6kgf load) of heat deflection temperatures (JIS-K7207 conformity) is desirable above. It consists of PP with bending elastic-modulus 27000 kgf/cm², 132 degrees C [of heat deflection temperatures], and a thickness of 2.5mm in this example.

[0023] moreover, the division section 22 forms in the portion of the fracture schedule section 15 of the aforementioned vehicle room flank material main part 21 along with the fracture schedule section 15 — having — the division section 22 — the reinforcement resin of vehicle room flank material main part 21 rear face — the member 31 ate away and it has exposed on vehicle room flank material main part 21 front face the width of face (division interval) of this division section 22 — suitably — ** — although carried out, generally you may be about 2mm or less in addition, this division section 22 — the aforementioned vehicle room flank material main part 21 and a

reinforcement resin — making a member 31 into the same color — moreover, it is desirable by really fabricating to carry out as [distinguish / hardly / from external surface / it]

[0024] a reinforcement resin — a member 31 is for concealing the fracture section end face of the air bag door 11, is formed by the resin more flexible than the rigid resin which constitutes the aforementioned vehicle room flank material main part 21, and is prepared in the air bag door 11 rear-face side of the vehicle room flank material main part 21 at one while making the vehicle room flank material 10 easy to fracture in the aforementioned fracture schedule section 15

[0025] the reinforcement resin of this example — the member 31 is formed so that the flection 32 crooked to the **** V typeface so that it might project to the vehicle room flank material main part 21 side may become the thickness of 3mm, 150mm long, and a 320mm wide rectangular plate-like object with plane view abbreviation zygal Thickness of the peak of the aforementioned flection 32 is made thinner than the other sections so that it may be easy to fracture at this peak. Generally you may be about 0.3–0.5mm.

[0026] Moreover, in order that the flection 32 crooked as mentioned above to the front-face side of the vehicle room flank material main part 21 may demonstrate the rigidity which serves as the press direction and abbreviation parallel direction, and becomes size when the fracture schedule section 15 neighborhood is pushed on time of peace from the front face of the vehicle room flank material 10, the on-the-strength enhancement effect in time of peace is high, and prevents the crack of the fracture schedule section 15.

[0027] further — the reinforcement resin of this example — a member 31 — a reinforcement resin — a member — the frame section 33 is set up near the periphery of 31 rear face This frame section 33 is inserted in the opening edge periphery of the air bag hold case C, and is used for performing fixation between the air bag case C and this vehicle room flank material 10. In addition, the fixation is made using fixed meanses, such as a bolt which is not illustrated.

[0028] the aforementioned reinforcement resin — from a resin with a member 31 more flexible than the rigid resin which constitutes the aforementioned vehicle room flank material main part 21 — becoming — bending elastic-modulus (JIS-K7203 conformity) 1000 kgf/cm² – 5000 kgf/cm² It is easy to fracture a resin and it is desirable in respect of reinforcement of air bag door 11 portion. the aforementioned vehicle room flank material main part 21 — bending — elastic-modulus 27000 kgf/cm² the example of PP to a bird clapper — setting — a reinforcement resin — a member 31 — bending elastic-modulus 3000 kgf/cm² It consists of a TPO (polyolefine system thermoplastic elastomer) resin.

[0029] In addition, injection molding etc. can perform easily fabrication of the aforementioned vehicle room flank material 10. namely, — first — injection molding etc. — a reinforcement resin — a member 31 is formed subsequently, the reinforcement resin — a member 31 — a form block — as an insertion — arranging — rigid resin — injecting — a reinforcement resin — the desired vehicle room flank material 10 can be obtained by forming the vehicle room flank material main part 21 which was united with the member 31

[0030] a reinforcement resin [in / the fracture schedule section 15 / as the vehicle room flank material 10 of the aforementioned structure was described above in time of peace] — the on-the-strength increase operation which the flection 32 of a member 31 does so can protect crack initiation in the fracture schedule section 15 also to surface press

[0031] and — the time of a shock joining an automobile by collision etc. — the operation of Inflator I — an air bag A — expanding — thereby — a reinforcement resin — the rear face of a member 31 is pushed, the fracture schedule section 15 of thin meat fractures, as shown in drawing 4, the air bag door 11 crooks and opens with a hinge 12, and an air bag A develops in the car Agreement 15a is the fracture section. the reinforcement resin with which the vehicle room flank material main part 21 which consists of rigid resin consists of a resin more flexible than it in the fracture schedule section 15 at the time of the aforementioned air bag expansion — the press force according to air bag expansion since it is beforehand divided by the member 31 — the reinforcement resin of the fracture schedule section 15 — it concentrates on a member 31 and fractures efficiently and the reinforcement resin — since the member 31 consists of resins more flexible than the rigid resin of the vehicle room flank material main part 21, fracture is made much more smoothly and quickly

[0032] If the air bag A which once expanded carries out predetermined-time progress after that, it will fade, as shown in drawing 5 . the air bag door 11 which serves as the state in the state where it opened to the vehicle interior of a room, in that case — a fracture section 15a portion — setting — the aforementioned fragmentation circles peripheral surface (minute cross section) 22a of the vehicle room flank material main part 21 — the aforementioned reinforcement resin — it is concealed by the flection 32 of a member 31, stiff rigid resin is not exposed, and it is desirable as vehicle room flank material

[0033] Next, the example of invention of a claim 2 is explained. The perspective diagram in which the perspective diagram showing near [in / the example / in drawing 6] an air bag door and drawing 7 show near / in other examples of invention the expanded sectional view of the hinge region and drawing 9 were indicated by the c-c cross section of drawing 6 , and drawing 10 was indicated to be for the b-b cross section of drawing 6 and drawing 8 by the claim 2 / an air bag door, and drawing 11 are the d-d cross sections of drawing 10 .

[0034] In invention indicated by the claim 2, as shown in drawing 6 or drawing 9 the reinforcement resin prepared in the air bag door 11A background of vehicle room flank material 10A — a member — 31A between end of ends 16of fracture schedule section 15A A of vehicle room flank material main part 21A, and 16A, and in between [12A and 13A] 17A and 17A (i.e., hinge regions) It is crooked to the front-face side of vehicle room flank material main part 21A, flection 34for hinges A and 35A are formed, and the thickness of vehicle room flank material main part 21A is thin by this hinge region 12A and 13A. About other points, it is the same as invention indicated by the claim 1. a reinforcement resin [in / the fracture schedule section / in sign 32A] — a member — the flection of 31A is shown

[0035] If it is in invention indicated by this claim 2, since stiff vehicle room flank material main part 21A is made thin in hinge region 12A and 13A, hinge region 12A13A tends to be crooked at the time of the aperture of air bag door 11A by air bag expansion, and air bag door 11A opens promptly. And since the crevice for a hinge region does not exist in the front face (superficies) of hinge regions 12A and 13A, the appearance of vehicle room flank material 10A is good.

[0036] The perspective diagram and drawing 11 which show near [in other examples of invention drawing 10 was indicated to be by the claim 2] an air bag door are the d-d cross section of drawing 10 . vehicle room flank material 10B of this example — fracture schedule section 15B — from an abbreviation U typeface — becoming — the configuration — responding — a reinforcement resin — a member — it consists of aforementioned drawing 6 or the same structure as the example of drawing 9 except for the point that 31B is formed a reinforcement resin [in / the fracture schedule section / B / between / the ends-end of the fracture schedule section / , and 21/ B / 16/ a hinge region and / B / 12/ an air bag door and / B / sign 11/ in a vehicle room flank material main part and 32B] — the flection of a member and 34B are the flections for hinges

[0037] Next, the example of invention of a claim 3 is explained. The cross section of the vehicle room flank material which drawing 12 requires for one example of invention indicated by the claim 3, and drawing 13 are the cross sections showing the time of air bag expansion of this example. that for which the vehicle room flank material 40 of illustration is used as an instrument panel — it is — the air bag door 41 — one — having — the vehicle room flank material main part 45 and a reinforcement resin — it consists of a member 57 The vehicle room flank material main part 45 consists of a base material 46, a foam 51, and epidermis 55, and constitutes the appearance of the vehicle room flank material 40. Agreement 52 is the line of the imagination which shows the fracture schedule section of a foam, and forms plane view abbreviation zygal. The fracture schedule section of vehicle room flank material is constituted by the fracture schedule section 52 of this foam, the fracture schedule section 47 of a base material, and the fracture schedule section 56 of epidermis, and the air bag door 41 is divided.

[0038] A base material 46 holds the configuration of this vehicle room flank material 40, or is for giving the rigidity which can bear the predetermined press force in time of peace, and consists of a rigid resin product formed according to vehicle room flank material 40 configurations by injection molding etc. The same thing as the rigid resin of the vehicle room flank material main part 21 shown in the example of the aforementioned claim 1 of a kind, thickness, physical

properties, etc. of the rigid resin which constitutes this base material 46 etc. is desirable.

Moreover, the fracture schedule section 47 for base materials is formed in the corresponding position with the fracture schedule sections 52 and 56 of other members at this base material 46. the reinforcement resin prepared in the rear face of a base material 46 used as the background of the air bag door 41 in this fracture schedule section 47 — it is in the state where the member 57 ate away and the base material 46 was made to divide In addition, the base material 46 of this example consists of PP with bending elastic-modulus 27000 kgf/cm², 132 degrees C [of heat deflection temperatures], and a thickness of 2.5mm.

[0039] It is a foam 51 and elastic foams, such as a polyurethane foam, are [for raising the buffer nature of vehicle room flank material 40 front faces] suitable for it. Moreover, epidermis 55 constitutes the front face of the vehicle room flank material 40, and consists of a plastics leather etc., and what was made into the predetermined configuration by slush molding, the vacuum forming, etc. is used. The fracture schedule section 56 for epidermis of the thin meat which consists of a slot of V typeface etc. is formed in the position which corresponds with the fracture schedule sections 47 and 52 of other members at this epidermis 55.

[0040] on the other hand — a reinforcement resin — it is for reinforcing the fracture schedule section 52 at time of peace, and is prepared in the rear face of a base material 46 used as the background of the air back doors 41 and 41 at one while enabling it to fracture a member 57 promptly in the aforementioned fracture schedule section 52 at the time of air bag A expansion this reinforcement resin — in the aforementioned fracture schedule section 47 for base materials, it is crooked in type at **** V:00 to the vehicle room flank material 40 front-face side of a base material 46, and it eats away in a base material 46, a base material 46 is divided, the peak portion of the flection 58 exposed to base-material 46 front face serves as thin meat, and a member 57 buries the fracture schedule section 47 for base materials

[0041] the aforementioned reinforcement resin — the reinforcement resin in which the member 57 became from the resin more flexible than a base material 46, and the thickness, the kind of resin, and physical properties were shown in the example of a claim 1 — it is the same as the case of a member 31 the reinforcement resin of this example — a member 57 — bending elastic-modulus 3000 kgf/cm² It consists of a TPO (polyolefine system thermoplastic elastomer) resin. moreover, the reinforcement resin of this example — a member 57 — from an abbreviation rectangle — becoming — the rear face — **** 59 for anchoring to the air bag hold case C — a reinforcement resin — it is formed inside [periphery] the member 57

[0042] in addition, fabrication of the aforementioned vehicle room flank material 40 — first — the aforementioned reinforcement resin — a member 57 — injection molding etc. — forming — the reinforcement resin — a member 57 — the inside of a form block — as an insertion — arranging — a base material 46 — a reinforcement resin — it forms in a member 57 and one subsequently, the aforementioned reinforcement resin — the base material 46 with which the member 57 was united, and epidermis 55 are set to a foaming type, a foaming raw material is poured in between a base material 46 and epidermis 55, and the foam 51 which was united with the aforementioned base material 46 and epidermis 55 is formed If the postforming article is picked out from a foaming type, the desired vehicle room flank material 40 will be obtained.

[0043] a base material 46 pushes the vehicle room flank material 40 which has the aforementioned structure at the time of air bag A expansion — having — the fracture schedule section 47 for base materials — the reinforcement resin of thin meat — a member 57 fractures the reinforcement resin which buries the fragmentation section since the base material 46 which consists of rigid resin is divided in the fracture schedule section 47 for base materials in that case — a member 57 — stress — concentrating — moreover — the reinforcement resin — a member 57 — a base material — eye a flexible hatchet — it fractures very promptly Moreover, a foam 51 fractures in the fracture schedule section 52 portion, and, almost simultaneously with it, epidermis 55 fractures in the fracture schedule section 56 for epidermis further. And as shown in drawing 13 , the air bag doors 41 and 41 are pushed open, an air bag A develops to the vehicle interior of a room, and the air bag A after time progress becomes small. thus, a reinforcement resin with the base material 46 more flexible than the rigid resin which the end face of the fracture sections 41a and 41a of the air bag door 41 fractured and opened becomes from rigid

resin — it is concealed by the aforementioned flection 58 of a member 57, and is desirable as vehicle room flank material

[0044] In addition, the aforementioned foam 51 may be formed in epidermis 55 and one as backing material of epidermis 55. Drawing 14 is the cross section showing the fracture schedule section of the vehicle room flank material which used such epidermis. In the example shown in this drawing, foam 51A to which epidermis 55A consists of a soft-polyvinylchloride-resin sheet, and becomes the rear face from polypropylene form is backed by one. In addition, improvement in an ornament is achieved, the front face of fracture schedule section 56A of epidermis 55A being used as a concave. Moreover, the V groove (not shown) which results in the background of fracture schedule section 56A of epidermis is suitably formed in the rear face of fracture schedule section 52A of foam 51A. a reinforcement resin [in / the fracture schedule section / A / 57/ the fracture schedule section of a base material, and / A / 47/ a base material and / A / sign 46/ in a reinforcement resin member and 58A] — it is the flection of a member

[0045] Next, invention indicated by the claim 4 is explained. It is the cross section in which drawing 15 shows the fracture schedule section of the one example like invention indicated by the claim 3 about that by which the laminating of a foam and the epidermis was carried out to the base material as for the vehicle room flank material of invention indicated by this claim 4.

[0046] if it is in invention of this claim 4, it is shown in drawing 15 — as — the position of fracture schedule section 52B of fracture schedule section 47 of base-material 46B B, and foam 51B — it is — a reinforcement resin — a member — flection 58 of 57B B divides base-material 46B and foam 51B, it is in contact with the epidermis rear face in fracture schedule section 56 of epidermis 55B B, and other structures are the same as that of invention indicated by the claim 3 the example of this invention — setting — fracture schedule section 56B and the reinforcement resin of epidermis 55B — a member — since foam 51B does not intervene among flection 58B of 57B, there is no possibility that foam 51B may disperse, at the time of fracture of the fracture schedule section by expansion of an air bag In addition, also in invention indicated by the claim 4, like other examples shown in drawing 16 , a concave may be prepared in the front face of fracture schedule section 56C of epidermis 55C, and ornament nature may be raised. sign 46C — a base material and a reinforcement resin [in / the fracture schedule section / C / 57/ the fracture schedule section of a foam, and / C / 52/ a foam and / C / 51/ the fracture schedule section of a base material, and / C / 47/ in a reinforcement resin member and 58C] — it is the flection of a member

[0047] Drawing 17 is the perspective diagram showing near an air bag door about one example of invention indicated by the claim 5. Invention indicated by this claim 5 like invention indicated by the aforementioned claims 3 or 4 It is related with that by which the laminating of foam 51D and the epidermis 55D was carried out to base-material 46D. in the ends end of fracture schedule section 47D of a base material by 43D, 43D, 44D, hinge region 48D between 44D, and 48D a reinforcement resin — a member — 57D is crooked to the front-face side of base-material 46D, flection 49D for hinges is formed, and it is characterized by the thickness of base-material 46D being thin in this section Therefore, at the time of the aperture of the air bag doors 41D and 41D by expansion of an air bag, it is easily crooked by hinge region 48D and 48D, and air bag door 41D and 41D open promptly. a reinforcement resin [in / the fracture schedule section / in sign 47D] — a member — the fracture schedule section of foam 51D and 56D of the flection of 57D and 52D are the fracture schedule sections of epidermis 55D

[0048] in addition, the example of drawing 17 — the fracture schedule section — setting — a reinforcement resin — although it is the case where foam 51D intervenes between the rear faces of flection 47D of a member, and epidermis 55D — the aforementioned reinforcement resin — it is made for flection 47D of a member to be contacted at the rear face of fracture schedule section 56D of epidermis through foam 51D

[0049] Moreover, let the aforementioned fracture schedule section suitably be an abbreviation U typeface other than abbreviation zygal also in invention indicated by the aforementioned claim 3 or 5.

[0050]

[Effect of the Invention] If it is in invention indicated by the claim 1 as it illustrates above and

being explained, since the fracture schedule section is constituted by the reinforcement resin member more flexible than a vehicle room flank material main part, at the time of air bag expansion, it fractures promptly and certainly and an air bag door is opened. Furthermore, in the aforementioned fracture schedule section, since the reinforcement resin member is crooked to the front-face side of vehicle room flank material, when a vehicle room flank material front face is pressed at time of peace, the intensity to the press direction is high, and it prevents producing a crack etc. in the fracture schedule section. In addition, since the vehicle room flank material main part which consists of rigid resin material will be concealed by the reinforcement resin member more flexible than it, the fracture section end face of an air bag door is desirable as vehicle room flank material.

[0051] Moreover, if it is in invention indicated by the claim 2, since a stiff vehicle room flank material main part is made thin by the hinge region and rigidity is low in invention of a claim 1, in addition to the effect of the invention indicated by the claim 1, the following effect is done so. That is, at the time of air bag expansion, following the fracture in the fracture schedule section, an air bag door is promptly crooked by the hinge region, opens to a vehicle interior-of-a-room side, and realizes smooth expansion of an air bag.

[0052] If it is in invention indicated by the claim 3, since the fracture schedule section of a base material is constituted by the reinforcement resin member more flexible than a base material on the other hand, at the time of air bag expansion, it fractures promptly and certainly and an air bag door is opened. Furthermore, in the fracture schedule section of the aforementioned base material, since the reinforcement resin member is crooked to the front-face side of vehicle room flank material, when a vehicle room flank material front face is pressed at time of peace, the intensity of the base material to the press direction is high, and it can prevent producing a crack etc. in the fracture schedule section. In addition, since the base material which consists of rigid resin material will be concealed by the reinforcement resin member more flexible than it, the fracture section end face of an air bag door is desirable as vehicle room flank material.

[0053] since [moreover,], as for invention of a claim 4, the reinforcement resin member touches the rear face of epidermis in the fracture schedule section in a claim 3 — the epidermis of the fracture schedule section, and a reinforcement resin — a member — a foam does not intervene in between, but in case vehicle room flank material fractures in the fracture schedule section, a possibility that a foam may disperse disappears

[0054] Furthermore, since the reinforcement resin member in claims 3 or 4 is crooked to a base-material front-face side during the ends end of the fracture schedule section, the flection for hinges is formed and the thickness of a base material is thin in this section, rigidity becomes low by the hinge region, and at the time of air bag expansion, following fracture in the fracture schedule section, an air bag door is promptly crooked by the hinge region, and invention of a claim 5 is opened to a vehicle interior-of-a-room side, and realizes smooth expansion of a

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective diagram of the vehicle room flank material concerning one example of invention indicated by the claim 1.

[Drawing 2] It is the expansion perspective diagram showing near the air bag door of drawing 1 .

[Drawing 3] It is the a-a cross section of drawing 1 .

[Drawing 4] It is the cross section showing the time of air bag expansion of this example.

[Drawing 5] It is the cross section showing the state where the air bag which once expanded became small.

[Drawing 6] It is the perspective diagram showing near [in one example of invention indicated by the claim 2] an air bag door.

[Drawing 7] It is the b-b cross section of drawing 6 .

[Drawing 8] It is the expanded sectional view of the hinge region.

[Drawing 9] It is the c-c cross section of drawing 6 .

[Drawing 10] It is the perspective diagram showing near [in other examples of invention indicated by the claim 2] an air bag door.

[Drawing 11] It is the d-d cross section of drawing 10 .

[Drawing 12] It is the cross section of the vehicle room flank material concerning one example of invention indicated by the claim 3.

[Drawing 13] It is the cross section showing the time of air bag expansion of this example.

[Drawing 14] It is the cross section showing the fracture schedule section about other examples of this invention.

[Drawing 15] It is the cross section showing the fracture schedule section about one example of invention indicated by the claim 4.

[Drawing 16] It is the cross section showing the fracture schedule section in other examples.

[Drawing 17] It is the perspective diagram showing near [in one example of invention indicated by the claim 5] an air bag door.

[Drawing 18] It is the e-e cross section of drawing 17 .

[Drawing 19] It is the perspective diagram of the vehicle room flank material which has a general air bag door in one.

[Drawing 20] It is the f-f cross section.

[Drawing 21] It is the cross section showing the time of the air bag expansion.

[Drawing 22] It is the cross section of other conventional examples of the vehicle room flank material which has an air bag door in one.

[Drawing 23] It is the cross section expanding and showing the part.

[Drawing 24] It is the cross section showing the time of the air bag expansion.

[Description of Notations]

11, 11A, 11B, 41, 41A, 41B, 41C, 41D: Air bag door

15, 15A, 15B: Fracture schedule section

21, 21A, 21B, 45: Vehicle room flank material main part

31, 31A, 31B, 57, 57A, 57B and 57C, and a 57D:reinforcement resin — a member

32, 32A, 32B, 58, 58A, 58B, 58C, and a 58D:reinforcement resin — the flection of a member

34A, 34B, 35A, 49D: The flecion for hinges
46, 46A, 46B, 46C, 46D: Base material
47 47A, 47B, 47C, 47D: The fracture schedule section of a base material
52, 52A, 52B, 52C, 52D: The fracture schedule section of a foam
51, 51A, 51B, 51C, 51D: Foam
55A, 55B, 55C, 55D: Epidermis
56, 56A, 56B, 56C, 56D: The fracture schedule section of epidermis

[Translation done.]

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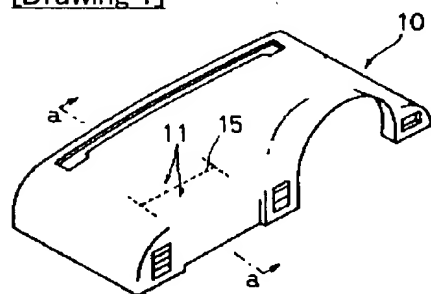
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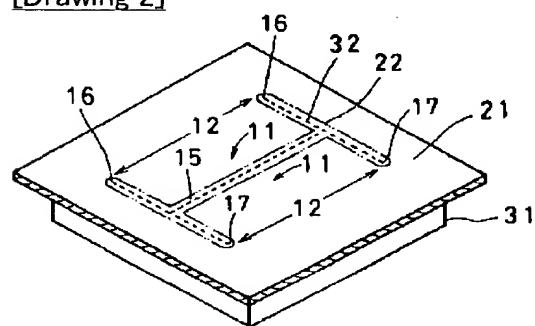
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DRAWINGS

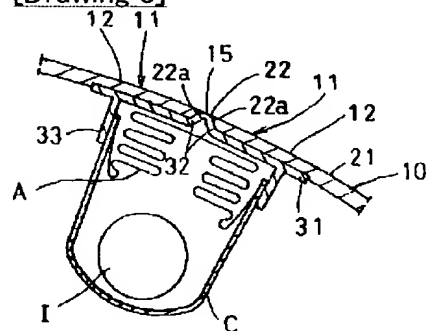
[Drawing 1]



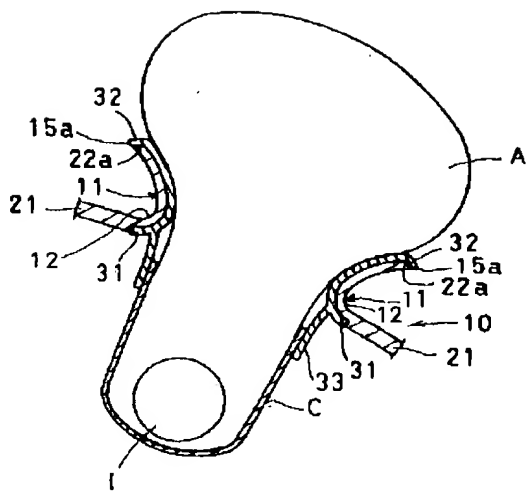
[Drawing 2]



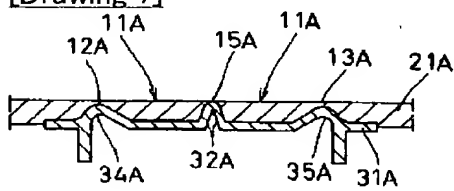
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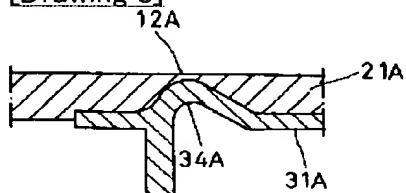
[Drawing 4]



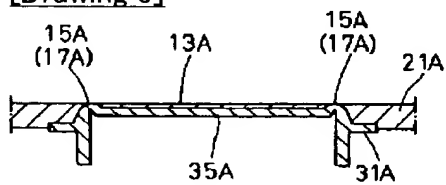
[Drawing 7]



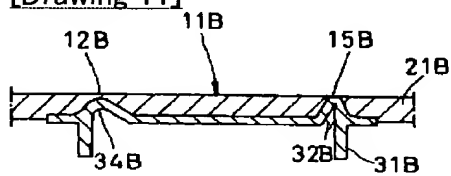
[Drawing 8]



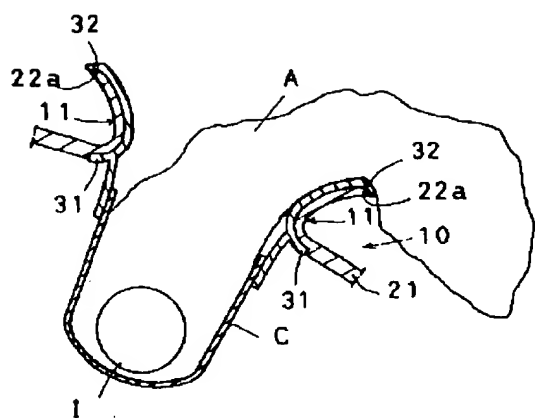
[Drawing 9]



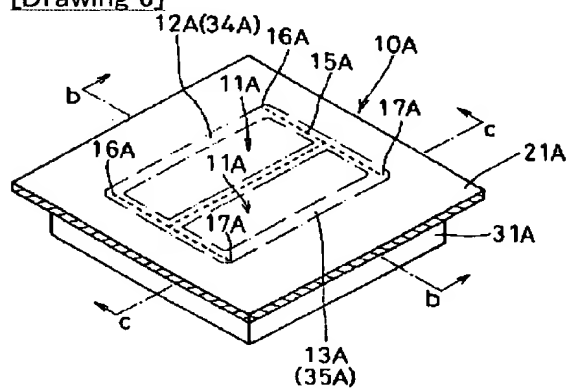
[Drawing 11]



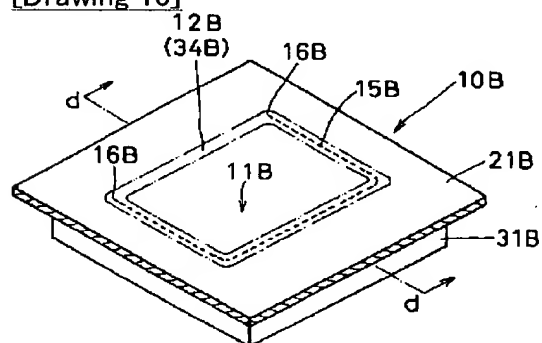
[Drawing 5]



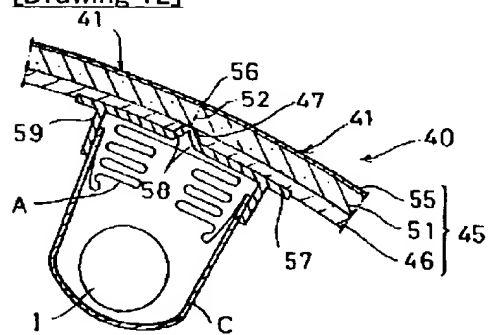
[Drawing 6]



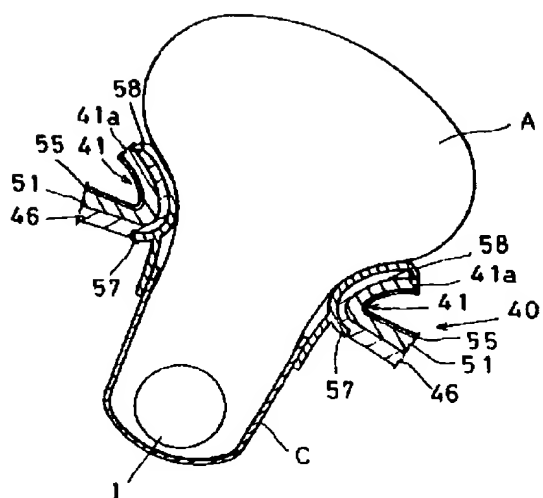
[Drawing 10]



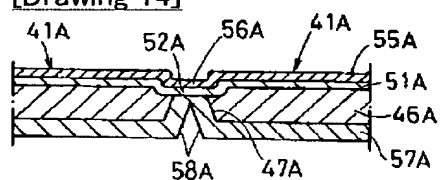
[Drawing 12]



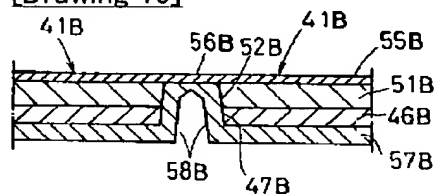
[Drawing 13]



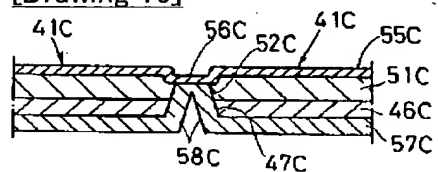
[Drawing 14]



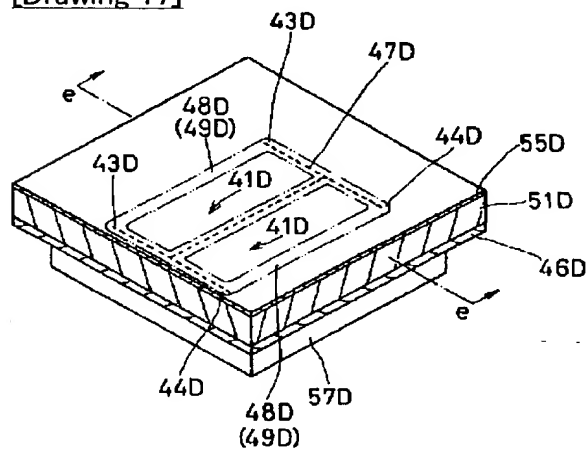
[Drawing 15]



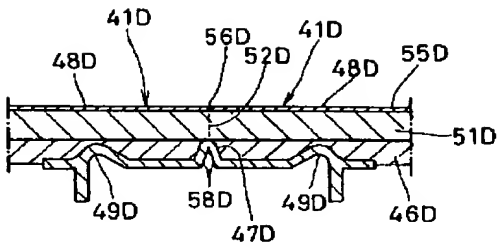
[Drawing 16]



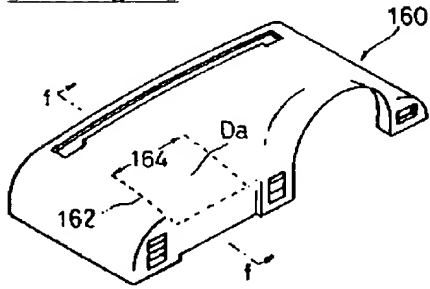
[Drawing 17]



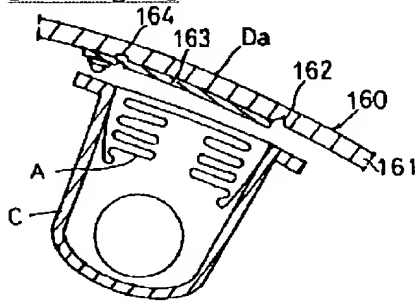
[Drawing 18]



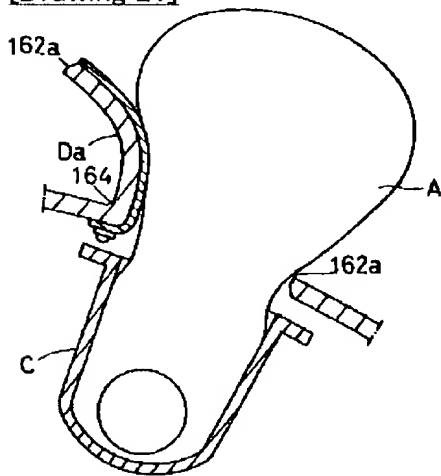
[Drawing 19]



[Drawing 20]



[Drawing 21]



[Drawing 22]

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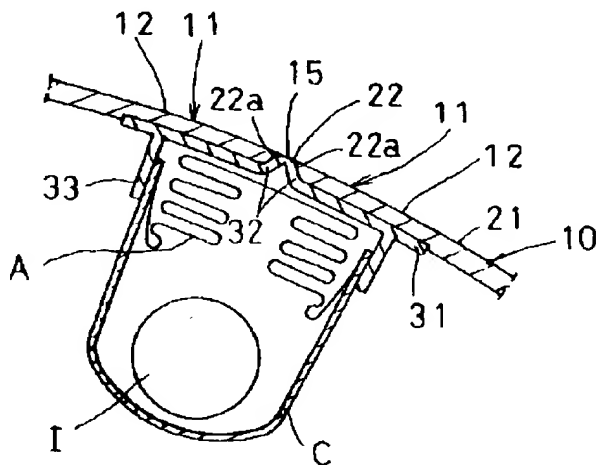
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(54) 【発明の名称】 エアバッグドアを一体に有する車室側部材の構造

(57) 【要約】

【課題】 エアバッグドアA膨張時に破断予定部から破断してエアバッグドアが開き、また平時には破断予定部に亀裂を生じ難い安全性の高い車室側部材の構造を提供する。

【解決手段】 エアバッグA膨張時に破断予定部から破断して開くエアバッグドア11を一体に有する車室側部材において、硬質樹脂からなる車室側部材本体21と、該車室側部材本体の硬質樹脂よりも柔軟な樹脂よりなって前記エアバッグドアの裏側に略相当する車室側部材本体の裏面に一体に設けられ、前記破断予定部で車室側部材本体を分断するように車室側部材本体の表面側へ屈曲して車室側部材本体表面に露出している補強樹脂部材31とよりなる。



【特許請求の範囲】

【請求項1】 樹脂製車室側部材に略H字状または略U字状等に破断予定部が形成され、エアバッグ膨張時に前記破断予定部から破断して開くエアバックドアを一体に有する車室側部材において、
硬質樹脂からなる車室側部材本体と、
該車室側部材本体の硬質樹脂よりも柔軟な樹脂よりなって前記エアバックドアの裏側に略相当する車室側部材本体の裏面に一体に設けられ、前記破断予定部で車室側部材本体を分断するように車室側部材本体表面側へ屈曲し、該屈曲部が薄肉とされて車室側部材本体表面に露出している補強樹脂部材とよりなることを特徴とするエアバックドアを一体に有する車室側部材の構造。

【請求項2】 請求項1において、補強樹脂部材が破断予定部の両端末間で車室側部材本体の表面側へ屈曲してヒンジ用屈曲部を形成し、該部で車室側部材本体の厚みが薄くなっていることを特徴とするエアバックドアを一体に有する車室側部材の構造。

【請求項3】 樹脂製車室側部材に略H字状またはU字状等に破断予定部が形成され、エアバッグ膨張時に前記破断予定部から破断して開くエアバックドアを一体に有する車室側部材において、
硬質樹脂からなる基材に発泡体および表皮が積層された車室側部材本体と、
前記基材の硬質樹脂よりも柔軟な樹脂よりなって前記エアバックドアの裏側に略相当する基材の裏面に一体に設けられ、前記破断予定部で基材を分断するように基材表面側へ屈曲し、該屈曲部が薄肉となって基材表面に露出している補強樹脂部材とよりなることを特徴とするエアバックドアを一体に有する車室側部材の構造。

【請求項4】 請求項3において、破断予定部で補強樹脂部材が表皮の裏面に接触していることを特徴とするエアバックドアを一体に有する車室側部材の構造。

【請求項5】 請求項3または4において、補強樹脂部材が破断予定部の両端末間で基材表面側へ屈曲してヒンジ用屈曲部を形成し、該部で基材の厚みが薄くなっていることを特徴とするエアバックドアを一体に有する車室側部材の構造。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】 この発明は、エアバックドアを一体に有する車室側部材の構造に関する。

【0002】

【従来の技術】 近年、自動車においては助手席にもエアバッグ装置が設けられるようになった。このエアバッグ装置は、エアバッグと、そのエアバッグが収納されるキャニスタと呼ばれる収容ケースと、作動装置（インフレーター）とからなり、助手席前面のインストルメントパネル等からなる車室側部材の裏側に取り付けられる。エアバッグ装置が設けられたインストルメントパネルのエア

バッグ部は、エアバッグのための展開開口部を有し、この開口部は平時には前記インストルメントパネルと同種の外観をもったエアバックドアによって覆われている。そして、一旦衝突などによって自動車が大きな衝撃を受けた時には、前記エアバックケース内に収納されているエアバッグが作動して膨張し、エアバックドアを内側から押して開口させる。

【0003】 しかし、エアバッグ用展開開口部とエアバックドアとが別体によって構成される構造のものにあっては、製品寸法のわずかなばらつきあるいは使用に伴う製品収縮などによりエアバックドア周囲に隙間を生じ易く、インストルメントパネルの外観が損なわれるおそれがある。また、後工程によってインストルメントパネルのエアバッグ用展開開口部にエアバックドアを取り付けることは工数を増大させることになる。

【0004】 そこで、最近では図19およびそのf-f断面である図20に示すインストルメントパネル160のように、ポリプロピレン樹脂等からなる硬質樹脂161裏面にノッチ状の薄肉の破断予定部162を、この例のように平面形状が略U字状に、あるいは図示しない略H字状となるように形成してエアバックドアDaを区画形成するとともに、該エアバックドアDa裏面にアルミ板や鉄板などの補強板163を裏打ちしたものが提案されている。符合164は破断予定部162の端部間で構成されるヒンジ部、Aはエアバッグ、Cはエアバッグ収容ケースである。この構造によれば、図21に示すように、エアバッグAが膨張した際に前記インストルメントパネル160の破断予定部162が破断し、エアバックドアDaが開く。162aは前記破断予定部162が破断した部分である。

【0005】 また、図22およびその一部を拡大する図23に示すように、ポリプロピレン樹脂等の硬質樹脂からなってエアバッグ用展開開口部Oの形成された基材174に、ポリウレタン発泡体等の合成樹脂発泡体171が一体に積層形成され、さらにその表面が合成樹脂製表皮172で覆われてなる車室側部材（インストルメントパネル）Pが知られている。符合173は表皮172に形成された薄肉破断予定部、175はエアバックドア用芯材、176は車室側部材Pとエアバッグ収容ケースCとを固定する取付け部材、Dはエアバックドア、Tは発泡体171の破断予定部である。この構造によれば、図24に示すように、エアバッグ膨張時にエアバックドアDが裏側からエアバッグAにより押され、金属板等からなるエアバックドア用芯材175を押し上げ、その押圧力によって発泡体の破断予定部Tおよび表皮172の薄肉破断予定部173が破断してエアバックドアDが開く。符合Ta、Tbは分断された発泡体の破断部、177はヒンジ部である。

【0006】 しかし、前者のタイプ、すなわち車室側部材が硬質樹脂からなるものにあつては、エアバッグの膨

張によって速やかに破断するよう、破断予定部の厚みを極めて薄くしなければならず、成形性との兼ね合いでその設計が容易ではなかった。しかも、破断予定部の厚みを極めて薄くすると、平時に破断予定部表面が乗員等によって押圧されると、該破断予定部に亀裂等を生じるおそれがある。

【0007】一方、後者のタイプ、すなわち車室側部材が、硬質樹脂製の基材と発泡体と表皮からなるものにあつては、基材に形成されたエアバッグ用展開開口部に鉄板等のエアバッグドア用芯材を確実に固定しなければならぬため、成形作業が煩雑であり、またコスト高となる問題があつた。

【0008】さらに、前記のいずれのタイプにおいても、エアバッグは膨張してエアバッグドアを押し上げた後、所定時間経過するとしぼんでしまう。その際、エアバッグドアは完全に閉じることなく開かれたままとなり、エアバッグドアDa、Dの破断部162a、Taが上方を向いた状態となる。このエアバッグドアの破断部は硬質樹脂の破断面、あるいはエアバッグドア用芯材175の端面が露出しているため硬く、好ましいものではなかった。

【0009】

【発明が解決しようとする課題】この発明は、前記の点に鑑みなされたもので、エアバッグの膨張によって破断予定部が速やかに破断してエアバッグドアが開き、また平時には破断予定部に亀裂を生じ難く、さらにはエアバッグドアの破断部における硬質樹脂端面がそれより柔軟な樹脂で隠蔽された安全性の高い車室側部材の構造を提供するものである。

【0010】

【課題を解決するための手段】請求項1の発明は、樹脂製車室側部材に略H字状または略U字状等に破断予定部が形成され、エアバッグ膨張時に前記破断予定部から破断して開くエアバックドアを一体に有する車室側部材において、硬質樹脂からなる車室側部材本体と、該車室側部材本体の硬質樹脂よりも柔軟な樹脂よりなつて前記エアバッグドアの裏側に略相当する車室側部材本体の裏面に一体に設けられ、前記破断予定部で車室側部材本体を分断するように車室側部材本体表面側へ屈曲し、該屈曲部が薄肉とされて車室側部材本体表面に露出している補強樹脂部材とよりなることを特徴とするエアバッグドアを一体に有する車室側部材の構造に係る。

【0011】この請求項1に記載された発明にあつては、車室側部材が、その外形を定める硬質樹脂製の車室側部材本体と、その車室側部材本体裏面のエアバッグドア裏面部分に相当する部分に設けられた補強樹脂部材とよりなり、エアバッグの膨張によりエアバッグドア部分が内側から押されて破断予定部で破断する。

【0012】前記破断予定部では、車室側部材本体の硬質樹脂より柔軟な補強樹脂部材が車室側部材本体を分断

するように車室側部材本体表面側へ屈曲して車室側部材本体表面に露出しているため、車室側部材本体の分断部を埋める補強樹脂部材が、エアバッグの膨張により破断する。したがつて、車室側部材本体の硬質樹脂より柔軟な補強樹脂部材が破断することになるため、その破断が速やかになされることとなる。また、その破断のし易さから前記破断予定部における補強樹脂部材の厚みの設定は、硬質樹脂の場合より厚くでき、その設定できる厚み範囲が広がつて成形も容易となる。

【0013】さらに、前記のように破断予定部では補強樹脂部材によって車室側部材本体に分断部が形成され、その分断部の内周面（分断面）が、車室側部材本体の表面側へ屈曲した補強樹脂部材で覆われた状態となっている。したがつて、前記補強樹脂部材の破断により開いたエアバッグドアの破断部端面は、前記車室側部材本体の分断部内周面を覆う補強樹脂部材で構成され、硬質樹脂より柔軟な樹脂（補強樹脂部材）で隠蔽された状態となる。

【0014】請求項2の発明は、請求項1において、補強樹脂部材が破断予定部の両端末間で車室側部材本体の表面側へ屈曲してヒンジ用屈曲部を形成し、該部で車室側部材本体の厚みが薄くなつてゐることを特徴とする。

【0015】この請求項2の発明にあつては、硬い車室側部材本体がヒンジ部で薄くされて剛性が低くなつてゐるため、エアバッグ膨張時、破断予定部の破断に続き、エアバッグドアがヒンジ部で速やかに屈曲して車室内側へ開き、エアバッグのスムーズな展開を実現する。特に、請求項1の発明において車室側部材本体の裏面に補強樹脂部材が一体に設けられるため、ヒンジ部における厚みが増して剛性が高まるおそれがあるが、この請求項2の発明によれば、ヒンジ部の剛性を低下させ、エアバッグドアがより速やかに開くことができるようになる。その結果、エアバッグドアが未だ車室内側に十分屈曲する前に、破断予定部（破断後の破断予定部）の隙間からエアバッグが車室内にはみ出して、スムーズなエアバッグの展開が妨げられるのをより確実に防ぐことができる。さらに、エアバッグドアの表面側にはヒンジ部の剛性を下げるための凹部を設ける必要がないので、車室側部材の外観が良好になる。

【0016】一方、請求項3の発明は、樹脂製車室側部材に略H字状またはU字状等に破断予定部が形成され、エアバッグ膨張時に前記破断予定部から破断して開くエアバックドアを一体に有する車室側部材において、硬質樹脂からなる基材に発泡体および表皮が積層された車室側部材本体と、前記基材の硬質樹脂よりも柔軟な樹脂よりなつて前記エアバッグドアの裏側に略相当する基材の裏面に一体に設けられ、前記破断予定部で基材を分断するように基材表面側へ屈曲し、該屈曲部が薄肉となつて基材表面に露出している補強樹脂部材とよりなることを特徴とするエアバッグドアを一体に有する車室側部材の

構造に係る。

【0017】この請求項3に記載された発明にあっては、車室側部材が、硬質樹脂製基材に発泡体および表皮が積層された車室側部材本体と、前記基材裏面のエアバッグドア裏面部分に相当する部分に設けられた補強樹脂部材とよりなる。この請求項3の発明では、基材が、請求項1に記載された車室側部材本体と同様の構成からなる。そして、エアバッグの膨張によって、基材の破断予定部で補強樹脂部材が速やかに破断するとともに、該基材の破断予定部と対応する部分の発泡体および表皮も破断して、エアバッグドアが開く。エアバッグドアの破断部端面は、請求項1における車室側部材本体と同様の理由によって、基材の硬質樹脂より柔軟な補強樹脂部材で隠蔽された状態となる。

【0018】請求項4の発明は、請求項3における補強樹脂部材が破断予定部で表皮の裏面に接触していることを特徴とする。この請求項4の発明にあっては、破断予定部の表皮と補強樹脂部材間に発泡体が介在しないため、車室側部材が破断予定部で破断する際に発泡体が飛散するのを防止できる。

【0019】また、請求項5の発明は、請求項3または4における補強樹脂部材が破断予定部の両端末間で基材表面側へ屈曲してヒンジ用屈曲部を形成し、該部で基材の厚みが薄くなっていることを特徴とする。この請求項5の発明にあっては、硬い基材がヒンジ部で薄くされて剛性が低くなっているため、エアバッグ膨張時、破断予定部の破断に続き、エアバッグドアがヒンジ部で速やかに屈曲して車室内側へ開き、エアバッグのスムーズな展開を実現する。

【0020】

【発明の実施の形態】以下添付の図面に従ってこの発明を詳細に説明する。まず請求項1の発明の実施例について説明する。図1はその実施例の車室側部材の斜視図、図2はそのエアバッグドア付近の斜視図、図3は図1のa-a断面図、図4はエアバッグ膨張時、図5はエアバッグがしぼんだ際を示す断面図である。

【0021】図1ないし図3に示す車室側部材10は、自動車のインストルメントパネルを構成し、助手席側にエアバッグドア11を一体に有する。この車室側部材10は、車室側部材本体21と、車室側部材本体21の裏側に一体に設けられた補強樹脂部材31とよりなっており、エアバッグA膨張時に破断してエアバッグドア11の開きを可能にするための破断予定部15が、エアバッグドア11を区画するように、平面視略H字形に形成されている。なお、破断予定部15の平面形状は、従来技術の項の図19において示した破断予定部162のように略U字形とされることもある。符号12はエアバッグドアが開く際にヒンジ部となる部分で、破断予定部15の両端末16、16間、17、17間に位置する。

【0022】前記車室側部材本体21は、車室側部材1

0の外形を定めるとともにその表面を構成するもので、射出成形等により所要形状に形成された硬質樹脂成形品からなる。車室側部材本体21を構成する硬質樹脂は、車室側部材に求められる剛性や強度を有するもので、ポリプロピレン樹脂(PP)等の汎用硬質樹脂が用いられる。特に、剛性および形状保持性等の点から、曲げ弾性率(JIS-K7203準拠)2000kgf/cm²以上、熱変形温度(JIS-K7207準拠)120℃以上(4.6kgf荷重)のものが好ましい。この実施例では、曲げ弾性率2700kgf/cm²、熱変形温度132℃、厚み2.5mmのPPよりなる。

【0023】また、前記車室側部材本体21の破断予定部15の部分には、破断予定部15に沿って分断部22が形成され、その分断部22に車室側部材本体21裏面の補強樹脂部材31が食い込んで車室側部材本体21表面で露出している。この分断部22の幅(分断間隔)は適宜とされるが、一般的に2mm以下程度とされる。なお、この分断部22は、前記車室側部材本体21と補強樹脂部材31とを同色とすることによって、また一体成形することによりほとんど外面からは判別できないようにするのが好ましい。

【0024】補強樹脂部材31は、前記破断予定部15で車室側部材10を破断し易くするとともに、エアバッグドア11の破断部端面を隠蔽するためのもので、前記車室側部材本体21を構成する硬質樹脂よりも柔軟な樹脂で形成され、車室側部材本体21のエアバッグドア11裏面側に一体に設けられている。

【0025】この実施例の補強樹脂部材31は、厚み3mm、縦150mm、横320mmの長方形板状体に、車室側部材本体21側へ突出するように略逆V字形に屈曲した屈曲部32が、平面視略H字形となるように形成されている。前記屈曲部32の頂点の厚みは、該頂点で破断し易いように、他部よりも薄くされる。一般的に0.3~0.5mm程度とされる。

【0026】また、前記のように車室側部材本体21の表面側へ屈曲した屈曲部32は、平時に車室側部材10の表面から破断予定部15付近を押した際に、その押圧方向と略平行方向となって大なる剛性を発揮するため、平時における強度増大効果が高く、破断予定部15の亀裂を防止する。

【0027】さらにこの実施例の補強樹脂部材31では、補強樹脂部材31裏面の周縁近くに、枠部33が立設されている。この枠部33は、エアバッグ収容ケースCの開口端部外周に嵌められ、エアバッグケースCとこの車室側部材10との間の固定を行なうのに用いられる。なお、その固定は図示しないボルト等の固定手段を用いてなされる。

【0028】前記補強樹脂部材31は、前記車室側部材本体21を構成する硬質樹脂より柔軟な樹脂からなり、曲げ弾性率(JIS-K7203準拠)1000kgf

／ $\text{cm}^2 \sim 5000 \text{ kg f} / \text{cm}^2$ の樹脂が、破断し易く、またエアバッグドア11部分の補強の点で好ましい。前記車室側部材本体21が曲げ弾性率 $27000 \text{ kg f} / \text{cm}^2$ のPPからなるこの実施例においては、補強樹脂部材31は、曲げ弾性率 $3000 \text{ kg f} / \text{cm}^2$ のTPO（ポリオレフィン系熱可塑性エラストマー）樹脂からなる。

【0029】なお、前記車室側部材10の成形は、射出成形等により、容易に行なうことができる。すなわち、まず射出成形等によって補強樹脂部材31を形成する。次いで、その補強樹脂部材31を成型型にインサートとして配置し、硬質樹脂を射出して補強樹脂部材31と一体になった車室側部材本体21を形成することにより、所望の車室側部材10を得ることができる。

【0030】前記構造の車室側部材10は、平時においては、前記したように、破断予定部15における補強樹脂部材31の屈曲部32が奏する強度増大作用等によって、表面の押圧に対しても破断予定部15に亀裂の発生を防ぐことができる。

【0031】そして衝突等によって自動車に衝撃が加わった時には、インフレーターIの作動によってエアバッグAが膨張し、それにより補強樹脂部材31の裏面が押され、薄肉の破断予定部15が破断し、図4に示すようにエアバッグドア11がヒンジ12で屈曲して開き、エアバッグAが車内で展開する。符合15aは破断部である。前記エアバッグ膨張時、破断予定部15では、硬質樹脂からなる車室側部材本体21が、それより柔軟な樹脂からなる補強樹脂部材31によりあらかじめ分断されているため、エアバッグ膨張による押圧力が破断予定部15の補強樹脂部材31に集中し、効率よく破断する。しかもその補強樹脂部材31は、車室側部材本体21の硬質樹脂よりも柔軟な樹脂で構成されているため、破断が一層スムーズに、かつ迅速になされる。

【0032】一旦膨張したエアバッグAは、その後所定時間経過すると図5に示すようにしぼむ。その際、車室内に開いた状態のままとなるエアバッグドア11は、破断部15a部分において、車室側部材本体21の前記分断部内周面（分断面）22aが前記補強樹脂部材31の屈曲部32で隠蔽されており、硬い硬質樹脂が露出しておらず、車室側部材として好ましい。

【0033】次に請求項2の発明の実施例について説明する。図6はその実施例におけるエアバッグドア付近を示す斜視図、図7は図6のb-b断面図、図8はそのヒンジ部の拡大断面図、図9は図6のc-c断面図、図10は請求項2に記載された発明の他の実施例におけるエアバッグドア付近を示す斜視図、図11は図10のd-d断面図である。

【0034】請求項2に記載された発明においては、図6ないし図9に示すように、車室側部材10Aのエアバッグドア11A裏側に設けられた補強樹脂部材31A

が、車室側部材本体21Aの破断予定部15Aの両端部16A、16A間、17A、17A間、すなわちヒンジ部12A、13Aで、車室側部材本体21Aの表面側へ屈曲して、ヒンジ用屈曲部34A、35Aを形成し、該ヒンジ部12A、13Aで車室側部材本体21Aの厚みが薄くなっている。その他の点については、請求項1に記載された発明と同じである。符号32Aは破断予定部における補強樹脂部材31Aの屈曲部を示す。

【0035】この請求項2に記載された発明にあつては、ヒンジ部12A、13Aにおいて、硬い車室側部材本体21Aが薄くされているため、エアバッグ膨張によるエアバッグドア11Aの開き時にヒンジ部12A、13Aが屈曲しやすく、エアバッグドア11Aが速やかに開く。しかも、ヒンジ部12A、13Aの表面（外面）にはヒンジ部のための凹部が存在しないため、車室側部材10Aの外観が良好である。

【0036】図10は請求項2に記載された発明の他の実施例におけるエアバッグドア付近を示す斜視図、図11は図10のd-d断面図である。この実施例の車室側部材10Bは、破断予定部15Bが略U字形からなり、その形状に応じて補強樹脂部材31Bが形成されている点を除き、前記図6ないし図9の実施例と同様の構造からなる。符号11Bはエアバッグドア、12Bはヒンジ部、16Bは破断予定部の両端部間、21Bは車室側部材本体、32Bは破断予定部における補強樹脂部材の屈曲部、34Bはヒンジ用屈曲部である。

【0037】次に請求項3の発明の実施例について説明する。図12は請求項3に記載された発明の一実施例に係る車室側部材の断面図、図13は同実施例のエアバッグ膨張時を示す断面図である。図示の車室側部材40は、インストルメントパネルとして用いられるもので、エアバッグドア41を一体に有し、車室側部材本体45と補強樹脂部材57とよりなる。車室側部材本体45は、基材46、発泡体51および表皮55からなつて、車室側部材40の外形を構成する。符合52は発泡体の破断予定部を示す仮想の線であり、平面視略H字形を形成する。この発泡体の破断予定部52、基材の破断予定部47および表皮の破断予定部56により車室側部材の破断予定部が構成され、エアバッグドア41が区画される。

【0038】基材46は、この車室側部材40の形状を保持したり、平時における所定押圧力に耐えられる剛性を付与するためのもので、射出成形等により車室側部材40形状に応じて形成された硬質樹脂製品からなる。この基材46を構成する硬質樹脂の種類や、厚みや物性等は、前記請求項1の実施例で示した車室側部材本体21の硬質樹脂と同様のものが好ましい。また、この基材46には他の部材の破断予定部52、56と対応する位置に基材用破断予定部47が形成されている。この破断予定部47では、エアバッグドア41の裏側となる基材4

6の裏面に設けられた補強樹脂部材57が食い込んで基材46を分断させた状態となっている。なお、この実施例の基材46は、曲げ弾性率 27000kgf/cm^2 、熱変形温度 132°C 、厚み 2.5mm のPPよりなる。

【0039】発泡体51は、車室側部材40表面の緩衝性を高めるためのものでポリウレタン発泡体等の弾性発泡体が好適である。また表皮55は、車室側部材40の表面を構成するもので、プラスチックレザー等からなり、スラッシュ成形や真空成形等により所定形状とされたものが用いられる。この表皮55には、他の部材の破断予定部47、52と対応する位置にV字形の溝等からなる薄肉の表皮用破断予定部56が形成されている。

【0040】一方、補強樹脂部材57は、エアバッグA膨張時に前記破断予定部52で速やかに破断できるようにするとともに、平時にはその破断予定部52を補強するためのもので、エアバックドア41、41の裏側となる基材46の裏面に一体に設けられている。この補強樹脂部材57は、前記基材用破断予定部47において基材46の車室側部材40表面側へ略逆V時形に屈曲し、基材46内に食い込んで基材46を分断し、基材46表面に露出する屈曲部58の頂点部分が薄肉となって基材用破断予定部47を埋める。

【0041】前記補強樹脂部材57は、基材46より柔軟な樹脂からなり、その厚みや、樹脂の種類や物性は、請求項1の実施例において示した補強樹脂部材31の場合と同じである。この実施例の補強樹脂部材57は、曲げ弾性率 3000kgf/cm^2 のTPO（ポリオレフィン系熱可塑性エラストマー）樹脂からなる。また、この実施例の補強樹脂部材57は略長方形からなって、その裏面にエアバッグ収容ケースCへの取付け用枠部59が、補強樹脂部材57の周縁内側に形成されている。

【0042】なお、前記車室側部材40の成形は、まず前記補強樹脂部材57を射出成形等により形成し、その補強樹脂部材57を成型型内にインサートとして配置し、基材46を補強樹脂部材57と一体に形成する。次いで、前記補強樹脂部材57が一体となった基材46と、表皮55とを発泡成型型にセットし、基材46と表皮55間に発泡原料を注入して、前記基材46および表皮55と一体となった発泡体51を形成する。その後成型品を発泡成型型から取り出せば、所望の車室側部材40が得られる。

【0043】前記構造を有する車室側部材40は、エアバッグA膨張時、基材46が押されて、基材用破断予定部47で薄肉の補強樹脂部材57が破断する。その際、基材用破断予定部47では、硬質樹脂からなる基材46が分断されているため、その分断部を埋める補強樹脂部材57に応力が集中し、しかもその補強樹脂部材57が基材よりも柔軟なため、きわめて速やかに破断する。また、それとほとんど同時に、発泡体51がその破断予定

部52部分で破断し、さらには表皮55が表皮用破断予定部56で破断する。そして図13に示すようにエアバッグドア41、41が押し開かれ、エアバッグAが車室内に展開し、時間経過後エアバッグAがしぼむ。このように破断して開いたエアバッグドア41の破断部41a、41aの端面は、硬質樹脂よりなる基材46が、その硬質樹脂より柔軟な補強樹脂部材57の前記屈曲部58で隠蔽されており、車室側部材として好ましいものとなっている。

【0044】なお、前記発泡体51は表皮55の裏打ち材として表皮55と一体に形成されたものであってもよい。図14はそのような表皮を用いた車室側部材の破断予定部を示す断面図である。この図に示す例においては、表皮55Aが軟質塩化ビニル樹脂シートからなって、その裏面にポリプロピレンフォームからなる発泡体51Aが一体に裏打ちされている。なお、表皮55Aの破断予定部56Aの表面は凹溝とされて装飾向上が図られている。また、発泡体51Aの破断予定部52Aの裏面には、表皮の破断予定部56Aの裏側内に至るV溝（図示せず）が適宜形成される。符号46Aは基材、47Aは基材の破断予定部、57Aは補強樹脂部材、58Aは破断予定部における補強樹脂部材の屈曲部である。

【0045】次に請求項4に記載された発明について説明する。この請求項4に記載された発明の車室側部材は、請求項3に記載された発明と同様、基材に発泡体および表皮が積層されたものに関し、図15はその一実施例の破断予定部を示す断面図である。

【0046】この請求項4の発明にあつては、図15に示すように、基材46Bの破断予定部47Bおよび発泡体51Bの破断予定部52Bの位置で、補強樹脂部材57Bの屈曲部58Bが基材46Bおよび発泡体51Bを分断して、表皮55Bの破断予定部56Bにおける表皮裏面と接触しており、その他の構造は請求項3に記載された発明と同様である。この発明の実施例においては、表皮55Bの破断予定部56Bと補強樹脂部材57Bの屈曲部58B間に発泡体51Bが介在しないため、エアバッグの膨張による破断予定部の破断時に発泡体51Bが飛散する恐れがない。なお、請求項4に記載された発明においても、図16に示す他の実施例のように、表皮55Cの破断予定部56Cの表面に凹溝を設け、装飾性を高めてもよい。符号46Cは基材、47Cは基材の破断予定部、51Cは発泡体、52Cは発泡体の破断予定部、57Cは補強樹脂部材、58Cは破断予定部における補強樹脂部材の屈曲部である。

【0047】図17は請求項5に記載された発明の一実施例についてエアバッグドア付近を示す斜視図である。この請求項5に記載された発明は、前記請求項3または4に記載された発明と同様に、基材46Dに発泡体51Dおよび表皮55Dが積層されたものに関し、基材の破断予定部47Dの両端末43D、43D、44D、44

D間のヒンジ部48D、48Dで、補強樹脂部材57Dが基材46Dの表面側へ屈曲してヒンジ用屈曲部49Dを形成し、該部で基材46Dの厚みが薄くなっていることを特徴とする。従って、エアバッグの膨張によるエアバッグドア41D、41Dの開き時に、ヒンジ部48D、48Dで容易に屈曲してエアバッグドア41D、41Dが速やかに開く。符号47Dは破断予定部における補強樹脂部材57Dの屈曲部、52Dは発泡体51Dの破断予定部、56Dは表皮55Dの破断予定部である。

【0048】なお、図17の例は、破断予定部において補強樹脂部材の屈曲部47Dと表皮55Dの裏面間に発泡体51Dが介在する場合であるが、前記補強樹脂部材の屈曲部47Dが発泡体51Dを介することなく表皮の破断予定部56Dの裏面に接触するようにされることもある。

【0049】また、前記請求項3ないし5に記載された発明においても、前記破断予定部は略H字形の他に適宜略U字形とされる。

【0050】

【発明の効果】以上図示し説明したように、請求項1に記載された発明にあっては、破断予定部が車室側部材本体よりも柔軟な補強樹脂部材により構成されるため、エアバッグ膨張時に速やかに、かつ確実に破断してエアバッグドアを開く。さらに、前記破断予定部では補強樹脂部材が車室側部材の表面側へ屈曲しているため、平時に車室側部材表面が押圧された際に、その押圧方向に対する強度が高く、破断予定部で亀裂等を生じるのを防ぐ。加えて、エアバッグドアの破断部端面は硬質樹脂材よりなる車室側部材本体が、それより柔軟な補強樹脂部材により隠蔽されることになるため、車室側部材として好ましいものである。

【0051】また、請求項2に記載された発明にあっては、請求項1の発明において、硬い車室側部材本体がヒンジ部で薄くされて剛性が低くなっているため、請求項1に記載された発明の効果に加え、次の効果を奏する。すなわち、エアバッグ膨張時に破断予定部における破断に続き、エアバッグドアがヒンジ部で速やかに屈曲して車室内側へ開き、エアバッグのスムーズな展開を実現する。

【0052】一方、請求項3に記載された発明にあっては、基材の破断予定部が基材よりも柔軟な補強樹脂部材により構成されるため、エアバッグ膨張時に速やかに、かつ確実に破断してエアバッグドアを開く。さらに、前記基材の破断予定部では補強樹脂部材が車室側部材の表面側へ屈曲しているため、平時に車室側部材表面が押圧された際にも、その押圧方向に対する基材の強度が高く、破断予定部で亀裂等を生じるのを防ぐことができる。加えて、エアバッグドアの破断部端面は硬質樹脂材よりなる基材が、それより柔軟な補強樹脂部材で隠蔽されることになるため、車室側部材として好ましいもので

ある。

【0053】また、請求項4の発明は、請求項3において、破断予定部で補強樹脂部材が表皮の裏面に接触しているため、破断予定部の表皮と補強樹脂部材間に発泡体が介在せず、車室側部材が破断予定部で破断する際に発泡体が飛散する恐れがなくなる。

【0054】さらに請求項5の発明は、請求項3または4における補強樹脂部材が破断予定部の両端末間で基材表面側へ屈曲してヒンジ用屈曲部を形成し、該部で基材の厚みが薄くなっているため、ヒンジ部で剛性が低くなり、エアバッグ膨張時に、破断予定部での破断に続き、エアバッグドアがヒンジ部で速やかに屈曲して車室内側へ開き、エアバッグのスムーズな展開を実現する。

【図面の簡単な説明】

【図1】請求項1に記載された発明の一実施例に係る車室側部材の斜視図である。

【図2】図1のエアバッグドア付近を示す拡大斜視図である。

【図3】図1のa-a断面図である。

【図4】同実施例のエアバッグ膨張時を示す断面図である。

【図5】一旦膨張したエアバッグがしぼんだ状態を示す断面図である。

【図6】請求項2に記載された発明の一実施例におけるエアバッグドア付近を示す斜視図である。

【図7】図6のb-b断面図である。

【図8】そのヒンジ部の拡大断面図である。

【図9】図6のc-c断面図である。

【図10】請求項2に記載された発明の他の実施例におけるエアバッグドア付近を示す斜視図である。

【図11】図10のd-d断面図である。

【図12】請求項3に記載された発明の一実施例に係る車室側部材の断面図である。

【図13】同実施例のエアバッグ膨張時を示す断面図である。

【図14】同発明の他の実施例についてその破断予定部を示す断面図である。

【図15】請求項4に記載された発明の一実施例についてその破断予定部を示す断面図である。

【図16】他の例における破断予定部を示す断面図である。

【図17】請求項5に記載された発明の一実施例におけるエアバッグドア付近を示す斜視図である。

【図18】図17のe-e断面図である。

【図19】一般的なエアバッグドアを一体に有する車室側部材の斜視図である。

【図20】そのf-f断面図である。

【図21】そのエアバッグ膨張時を示す断面図である。

【図22】エアバッグドアを一体に有する車室側部材の他の従来例の断面図である。

【図23】 その一部を拡大して示す断面図である。

【図24】 そのエアバッグ膨張時を示す断面図である。

【符号の説明】

11, 11A, 11B, 41, 41A, 41B, 41C, 41D: エアバッグドア
15, 15A, 15B: 破断予定部
21, 21A, 21B, 45: 車室側部材本体
31, 31A, 31B, 57, 57A, 57B, 57C, 57D: 補強樹脂部材
32, 32A, 32B, 58, 58A, 58B, 58C, 58D: 補強樹脂部材の屈曲部

34A, 34B, 35A, 49D: ヒンジ用屈曲部

46, 46A, 46B, 46C, 46D: 基材

47, 47A, 47B, 47C, 47D: 基材の破断予定部

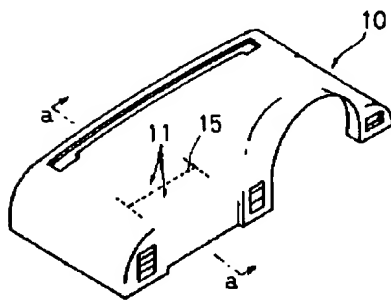
52, 52A, 52B, 52C, 52D: 発泡体の破断予定部

51, 51A, 51B, 51C, 51D: 発泡体

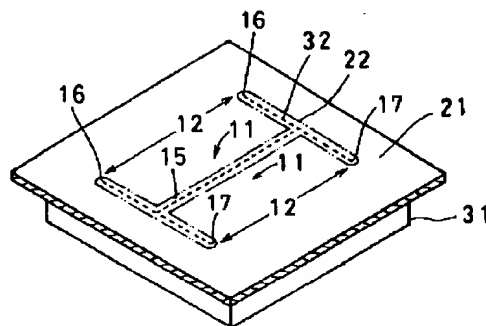
55A, 55B, 55C, 55D: 表皮

56, 56A, 56B, 56C, 56D: 表皮の破断予定部

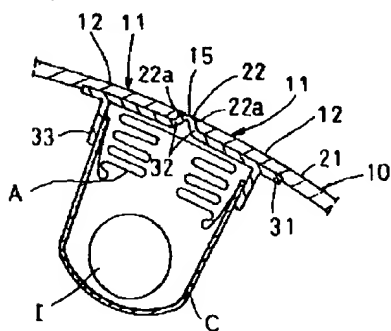
【図1】



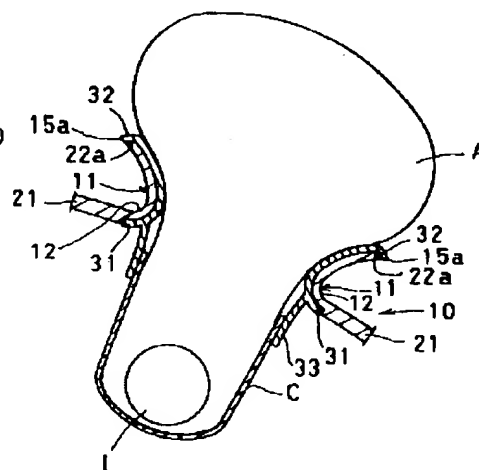
【図2】



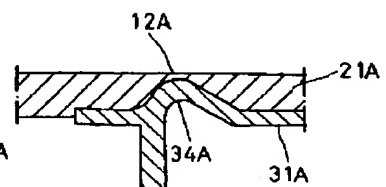
【図3】



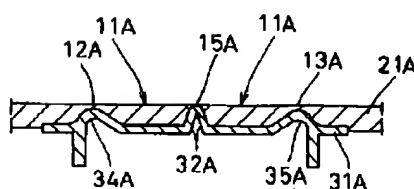
【図4】



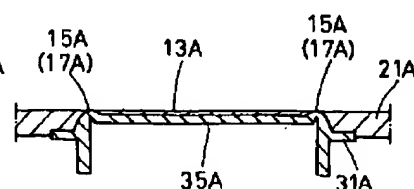
【図8】



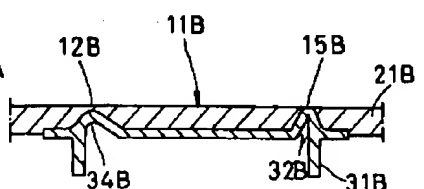
【図7】



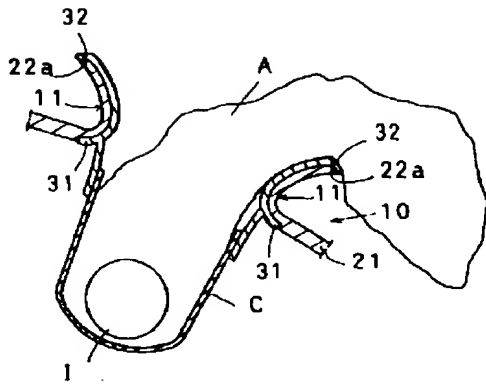
【図9】



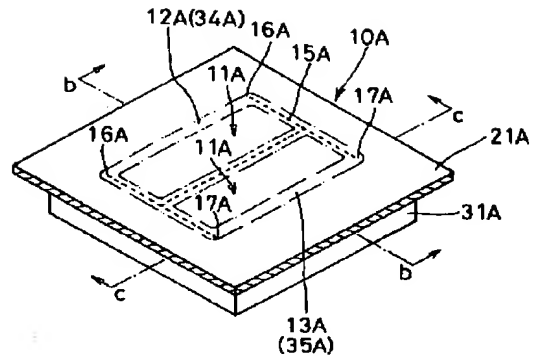
【図11】



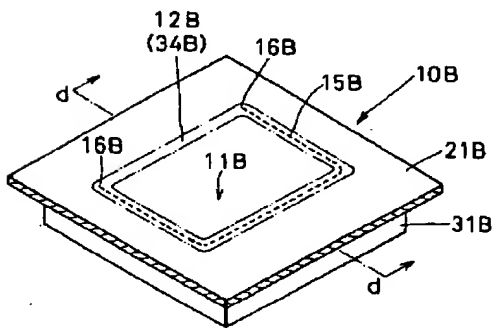
【図 5】



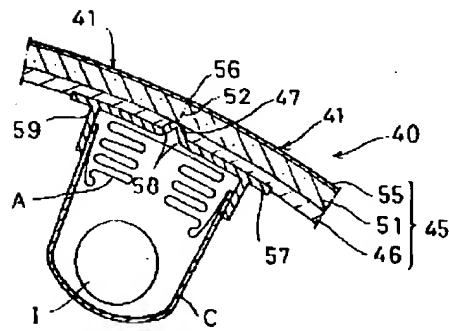
【図 6】



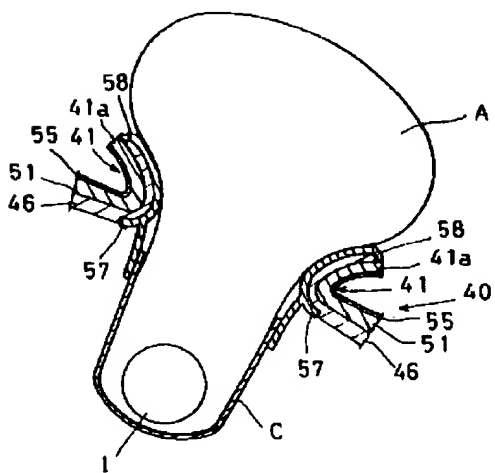
【図 10】



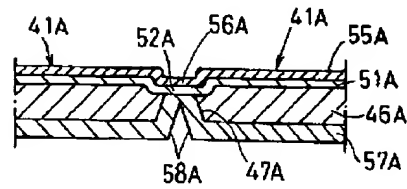
【図 12】



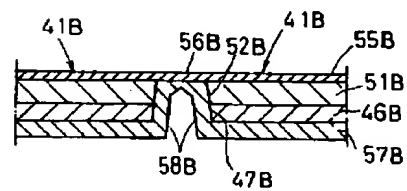
【図 13】



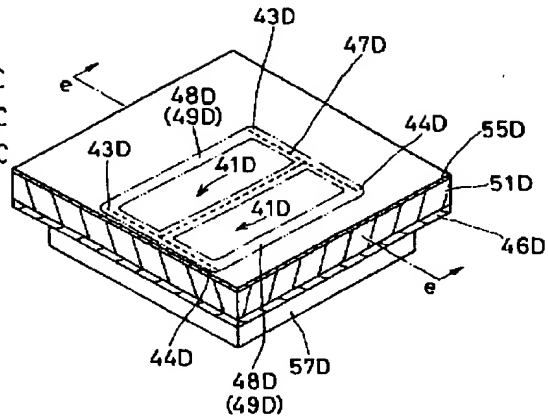
【図 14】



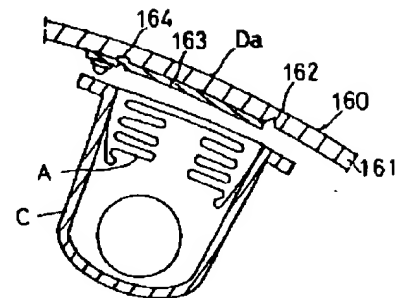
【図 15】



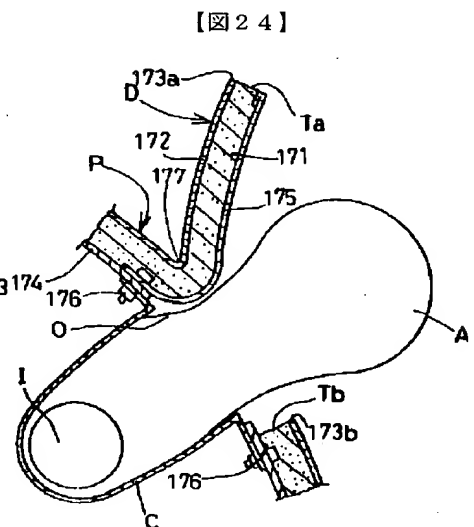
【図 17】



【図 20】



【图 2 2】



【図23】

